

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A plasma-assisted deposition method for forming an insulating film on a substrate placed on a support device in an airtight processing vessel by activating C₅F₈ gas by a plasma, characterized in that forming gas, the method using a plasma-assisted deposition system and comprising:

radiating a microwave from a plurality of slots in a circumferential arrangement in a flat antenna member disposed opposite to the support device;

guiding the microwave by a wave guide into the airtight processing vessel;

supplying the plasma forming gas, including a rare gas, into the airtight processing vessel with a plasma forming gas discharge head disposed between the flat antenna member and the support device;

supplying the C₅F₈ gas into the airtight processing vessel with a C₅F₈ gas discharge head disposed between the plasma forming gas discharge head and the support device, while conducting the plasma forming gas vertically through a plurality of through holes in the C₅F₈ gas discharge head;

a space extending between C₅F₈ gas supply openings and a surface of the substrate has providing an electron temperature of 2 eV or below and an electron density of 5x10¹¹ electrons per cubic centimeter or above[[],] in a space extending between C₅F₈ gas supply openings in the C₅F₈ gas discharge head and a surface of the substrate;

pressure of providing a processing atmosphere is pressure of 19.95 Pa or below[[],]; and

the insulating film to be deposited depositing on the substrate is the insulating film which is a fluorine-containing carbon film having a relative dielectric constant of 2.3 or below and permitting a leakage current of 5x10⁻⁸ A/cm² or below.

2. (Canceled)

3. (Currently Amended) The plasma-assisted deposition method according to ~~claim 2~~ claim 1, wherein the slots have a length between half the wavelength of the microwave at the side of the waveguide with respect to the flat antenna member and half the wavelength of the microwave at the side of the plasma producing space with respect to the flat antenna member.

4. (Currently Amended) The plasma-assisted deposition method according to ~~claim 2 or 3~~ claim 1, wherein the plurality of slots are arranged on concentric circles having their centers at the center of the flat antenna member or on a spiral around the center of the flat antenna member.

5. (Currently Amended) The plasma-assisted deposition method according to ~~claim 2 or 3~~ claim 1, wherein the microwave radiated from the flat antenna member is a circularly polarized wave or a linearly polarized wave.

6-8. (Canceled)

9. (Withdrawn) A plasma-assisted deposition system comprising:
an airtight processing vessel internally provided with a support device for supporting a substrate thereon;
a C₅F₈ gas supply system for supplying C₅F₈ gas for forming an insulating film on the substrate into the processing vessel;
a microwave generator for generating a microwave for activating the C₅F₈ gas to produce a plasma;
a waveguide for guiding the microwave generated by the microwave generator into the processing vessel; and

a flat antenna member connected to the waveguide, disposed opposite to the support device and provided with a plurality of slots formed therein in a circumferential arrangement;

characterized in that C₅F₈ gas is activated by the plasma, a space extending between C₅F₈ gas supply openings and a surface of the substrate has an electron temperature of 2 eV or below and an electron density of 5x10¹¹ electrons per cubic centimeter or above, a processing atmosphere has a process pressure of 19.95 Pa or below, and a fluorine-containing carbon film deposited by a film deposition process on the substrate placed on the support device has a relative dielectric constant of 2.3 or below and permits a leakage current of 5x10⁻⁸ A/cm² or below.

10. (Withdrawn) The plasma-assisted deposition method according to claim 9, wherein the slots have a length between half the wavelength of the microwave at the side of the waveguide with respect to the flat antenna member and half the wavelength of the microwave at the side of the plasma producing space with respect to the flat antenna member.

11. (Withdrawn) The plasma-assisted deposition system according to claim 10, wherein the plurality of slots are arranged on concentric circles having their centers at the center of the flat antenna member or on a spiral around the center of the flat antenna member.

12. (Withdrawn) The plasma-assisted deposition system according to any one of claims 9 to 11, wherein the microwave radiated from the flat antenna member is a circularly polarized wave or a linearly polarized wave.

13-14. (Canceled)